

DLLM Fine-tuning

Parallel generation
Fine-grained control
Response-aware

Parameter Update

Full Fine-tuning

LLaDA (2025)
Pre-train + SFT
Competitive w/ LLaMA3
Reversal curse solved

Training Objective

Supervised

LLDM (Nie 2025)
Instruction masks
Zero-shot transfer
Cross-lingual ability

Alignment

RLHF/DPO
Mercury (2025)
Preference optimization
1000+ tokens/sec

Hybrid

d1 Framework
SFT + diffu-GRPO
SOTA GSM8K
Best math reasoning

Research Timeline

2022

Diffusion-LM
Foundation work

2023

DiffuSeq, D3PM
Seq2seq tasks

2024 Q1

SEDD, SSD-2
First DLLM tuning

2024 Q3

David helps Goliath
Inference collab

2025 Q1

LLaDA, Mercury
Full fine-tuning

2025 Q2

d1 Framework
Hybrid methods

Future

Scaling laws
Multi-modal